Science Education International
33(2), 242-250
https://doi.org/10.33828/sei.v33.i2.12

International Council of Association for Science Education

ORIGINAL ARTICLE

Students' Perception on Web-Based Technology in Teaching Biology in College of Education

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ABSTRACT

The perception of students in six (6) Southern Colleges of Education in Ghana on the use of web-based technology software for teaching and learning of biology was studied using 120 students. A questionnaire was used to collect data from the students on the perception they have about the use of web-based technology**.** The data from the questionnaire were analyzed using descriptive statistics. The findings revealed that the use of web-based technology instructional approach during lessons delivery and accessing the internet to search for information during instructional hours provided opportunities for students to access internet information at their own pace. It also came to light that the use of web-based instruction improved students' understanding in biology concepts, stimulated students' interest and thinking, and was not a waste of instructional time. The study revealed that students could use web-based software without any difficulties, the use of web-based instruction was not boring, the use of web-based instructions individualized learning and finally, the use of web-based technology for biology instruction was not time-consuming. Therefore, science tutors especially biology tutors should use web-based technology software for teaching and learning of biology concepts to make learning meaningful to students.

KEY WORDS: Web-based, perception, technology, web-quest, blog

INTRODUCTION

Science and Technology advancement has become an issue of major concern for most countries worldwide. That is, Science and Technology is applied in the areas such as Health, Agriculture, Education, Business, Industries and Engineering, Transport, and Housing. It is in the light of the above that has made a developing country like Ghana join the race for technology advancement in order not to be left out of globalization and development. In the centuries past, before the era of this Science and Technology, men lived and had their own ways of going about their economic endeavors. Their knowledge and ways of acquiring them were passed on as heritage from one generation to another through informal education. However, this knowledge as well as ways of passing it on had undergone some changes as they transcend from one generation to another. For instance, in the beginning, humans travelled several kilometers by foot, they moved from one place to another in search for food, they slept in buttress of big trees, they did guide their children on how to carry out activity; and children learnt them unconsciously. But after some generations, men began to travel on horses and with chariots, cultivated crops, stopped hunting for food from place to place, made permanent structures, stopped sleeping in the buttress of trees, started guiding and teaching their children on how to carry out some activities such as setting traps, building huts, and shooting without missing.

All these are evidence that knowledge acquisition, ways of acquiring it and its structure of acquisition have undergone changes and these changes have continued. Today, knowledge is acquired through formal education. Weller (1996) sees this change as a process to transform people's knowledge, attitude, and behavior about the values of embracing something new or achieving something more beneficial. This change also implies doing something different from the way it was done previously, and this should have positive effect on the implementer himself/herself (Madison, 2003).

The era of formal education has not ceased this change. Formal education since its inception in Africa, has undergone several transformations; in terms of people's knowledge, their attitude, and behavior as well as structural, managerial, and resources. At present, formal education has witnessed a great transformation in terms of instructional approach. For instance, there has been a great transformation in the use of instructional approach for teaching and learning of biology. It has shifted from the traditional classroom methods where chalk or marker board and teacher's voice were used as teaching and learning materials to the use of technology-based instructional approach where computers, (overhead) projectors, smart boards**,** etc., are used. When teachers use technologies in their teaching and students are involved in the use of those technologies and notice the relationship and relevance of what the teacher is teaching and the technologies being used, the students' attitudes

Science Education International
33(2), 242-250
https://doi.org/10.33828/sei.v33.i2.12

toward learning get improved and that prepares them for the technologically oriented society (Majed**,** 1996**).**

There are forty-six (46) public Colleges of Education which are scattered across the sixteen regions in Ghana. These colleges are the institutions mandated by the Ministry of Education in Ghana to train teachers, under the mentorship of five public universities to go and teach in the basic schools in the country. For the student-teachers to teach well in their respective basic schools after completion of their respective training programs, then college tutors must integrate technology into their teaching, which of course most of them are doing it now.

Despite biology tutors' acceptance and usage of technology in their instructions, trainee students' interest and performance in biology lessons in Southern Colleges of Education in Ghana has not improved. This might be as a result of the types of technologies which the biology tutors use for instruction. It must be noted that in this 21st century, teaching and learning has gone beyond the physical classroom where there is a physical interaction between teachers and students. It has now reached a stage where teaching and learning takes place from distance and at different locations outside the physical classroom environment. Students must be able to interact with their course instructor through technology software such as Email, Social Media Platforms (e.g., WhatsApp, Twitter, Instagram, and Facebook**),** WebQuest, Google Classroom, Zoom, and etc. when the instructor cannot appear in the physical classroom during his or her instructional hour(s). In line with this change, the use of technology in teaching in the colleges of education must also change from the use of technology tools to the use of technology software**.** The focus of this research work is on the issue of the use of web-based technology. Several previous studies have incorporated technology in advanced courses that required critical analysis, higher-order thinking, and interaction with other participants (e.g., Alavi, 1994; Leidner and Jarvanpaa, 1993), but all these studies geared towards technology tools and non-web-based technology. A study which closely relates to this work, investigated the effectiveness of web-based virtual learning environment. This was done through experimental approach which made the scope of the study limited and therefore difficult to generalize the outcome. This research, however, seeks to investigate students' perception about the use of web-based technology software in teaching biology concepts through a virtual learning environment in six Colleges of Education in Ghana through a quantitative action research.

LITERATURE REVIEW

In a survey of teachers' perceptions of the effect of technology on students' performance, the respondents indicated strong agreement that technology had a positive effect on the students' performance (Hurley and Mundy, 1997). Again, teachers, and students understand the need for technology in the classroom, but there is an under-utilization of said technology (Gray et al., 2010). Thompson (2000) noticed that some universities still use traditional methods of teaching while others have seen the need to respond to the changing world and are using the new technologies in their instructions. This information is clear evidence that the reviewed literatures above and some other research reports giving positive indications of students' and teachers' perceptions of the use of technology in classrooms do not represent all the perceptions of students and teachers when it comes to the use of technology for teaching and learning. There are some students and teachers who still hold negative perceptions about integration of technology into teaching and learning activities. For instance, Sammons (1994) observed that teachers who already had too much class work and school responsibilities found that instructional technologies required additional time to learn and prepare for using them in the classroom. These teachers felt reluctant to incorporate technology in their lessons in order to save themselves from extra work of learning and using technology. Again, according to Cope and Ward (2002), experienced teachers who had little or no professional development in the use of technology in the classroom were less likely to use it in the classroom and were less likely to see the benefit of technology usage in the classroom.

Furthermore, close observation of the introduction of technology into the classroom indicates that many instructors have embraced it wholeheartedly and use it in their instructions more often than the traditional methods. They are of the view that the use of technology in classroom instruction has become the modern approach of teaching and whoever refuses its adaption and usage in his/her instruction will end up leaving his/her students behind in this rapidly changing world. The use of technology in the classroom has the benefit of increasing academic achievement from the perspective of both the students and the educators (Courville, 2011). In a study by Usher (2012), real-world applications of technology along with other academic subjects helped motivate students. By showing real world technological applications, intrinsic value can be brought to the learning process, increasing interest and motivation (Usher, 2012). Technology supports the need for divergent learning approaches, helping to create a sense of community as well as a meaningful experience (Futurelab, 2009). Appropriate use of technology can serve the regular education classroom by motivating students in all disciplines, such as math, social studies, and literacy (Heafner, 2004; Housand and Housand, 2012). Students who have identified learning disabilities can be served by the appropriate integration of technology through assistive technology devices, allowing students to access the information and maintain pace with a regular education classroom (Floyd and Judge, 2012). By integrating technology into education, teachers will be able to motivate and include the entire spectrum of students from learning disabled to gifted and talented (Floyd and Judge, 2012).

Majed (1996) in support of these views asserted "the use of technology makes possible increased individual instructional opportunities which enables the teacher to have adequate spare

time for preparation of instruction that will meet the needs of the learners" (p. 59). Furthermore, when using instructional technology, the teacher can explain concepts that would be difficult to elaborate orally (Kadezera, 2006). When students see the materials, its mechanism and its function, teachers are saved the hard explanation and students easily understand what the teacher is talking about (Ministry of Education, 1995). Geisert and Futrell (2000) elaborated that when the computers first appeared in the classroom, teachers who used them enjoyed them. Baylor and Ritchie (2002) found that teachers valued the use of technologies in class and that it had an impact on students' content acquisition; the use of technology added to class performance. In agreement with these observations, Koehler and Mishra (2009) argued that in every good teaching with technology there are three components: content, pedagogy, and technology. They continued by saying that just bringing technology to the educational institutions is not enough to ensure its success. What is important is the extent to which teachers will utilize the technology in their teaching (Kafulilo, 2013) and appropriateness of the technology to the content to be delivered. For integration of technology into pedagogy and content to occur, teachers need to have knowledge about the science content they teach and how that subject matter can be transformed by the application of technology (Koehler and Mishra, 2009). Furthermore, teachers should have the knowledge of various technologies as they are used in teaching and learning settings (Richardson, 2009).

Before the implementation of any technology in curriculum, teachers and students should be aware of why the technology is being used and how it will help meet educational goals and objectives (Sinclair, 2009). This will ensure that the technology is used to maximize results, rather than to have other accidental, purposeful, or improper uses (Thurlow et al., 2004). Technology should not be used just because it is available, but rather, because it will enable teachers and students to reach learning goals that were not obtainable or as easily obtainable without the technology (Dror, 2008). One of the most telling factors of whether a technology will be successfully incorporated in curriculum is the knowledge and competency level of the teachers who will use and teach others to use the technology (Sinclair, 2009). The teacher's role is critical in structuring activity in ways that challenge and build upon pupils' implicit conceptualizations, while integrating new scientific ideas (Hennessy et al., 2007). Technology that is incorporated into the classroom for the purpose of enhancing the learning process is referred to as technology enhanced learning (TEL) tool (Dror, 2008). A TEL tool could be a technology tool, a web-based technology software, or a non-web-based technology software.

In fact, for schools and colleges to recognize how meaningful and successful technology integration into teaching and learning is, they must be able to draw distinction among technology tools, web-based technology software, and non-web-based technology software as well as know when and how to use each type. A software is a program which is designed to perform specific activity or function whiles the tool is the machine, instrument or equipment that operates the software for it to perform its function. These software programs are more often associated with computers (desktop, laptop, etc.) and various models and brands of phones. The web-based software includes the Internet, email, Social Media Platforms (e.g. WhatsApp, Twitter, and Facebook), WebQuest, Web-conferencing, Blog, and Wikis and non-web-based software include Microsoft programs (Word, Excel, PowerPoint, etc.), Computer Simulation, Digital Videos/Games, etc., whiles Projectors, Interactive or Smart Boards, Charts/Pictures, Laboratory Equipment, Flip Charts, etc., are the technology tools. Internet has given students a new way to do research, allowed teachers to offer a wider topic range, and made available an endless amount of information. In addition, email connects teachers and students from all over the world so they can work collaboratively with other teachers and students anywhere in the world (Lim et al., 2013).

Some teachers are, however, of the view that integrating Information and Communication Technology (ICT) into teaching and learning is a complex process and one that may encounter a number of difficulties. These difficulties are known as "challenges" (Schoepp, 2005). A challenge is defined as any condition that makes it difficult to make progress or to achieve an objective (WordNet as cited in Schoepp, 2005) They have, therefore, perceived and discussed some of the key challenges that have been identified in the literatures regarding teachers' use of ICT tools in classroom as follow:

Limited Accessibility and Network Connection

Several research studies indicate that lack of access to resources, including home access, is another complex challenge that prevents teachers from integrating new technologies into education. Various research studies indicated several reasons for the lack of access to technology. For example, in Sicilia's (2005) study, teachers remarked, "computers had to be booked in advance and the teachers would forget to do so, or they could not book them for several periods in a row when they wanted to work on several projects with the students" (p. 50). In other words, a teacher would have no access to ICT materials because most of these were shared with other teachers. The inaccessibility of ICT resources is not always due to the non□availability of the hardware and software or other ICT materials within the school. It could also be as a result of other factors such as poor resource organization, poor quality hardware, inappropriate software, or lack of personal access for teachers. The challenges related to the accessibility of new technologies for teachers are widespread and differ from country to country. Korte and Hüsing (2007) found that in European schools there are some infrastructure barriers such as broadband access not yet being available. They concluded that one third of European schools still lack broadband Internet access. Pelgrum (2001) explored practitioners' views from 26 countries on the main obstacles to ICT implementation in schools. He concluded that four of the top ten barriers were related to the accessibility of ICT. These barriers

were insufficient unit of computers, insufficient peripherals, insufficient numbers of copies of software, and insufficient immediate Internet access. Toprakci (2006) found that low numbers of computers, oldness or slowness of ICT systems, and scarcity of educational software in the school were barriers to the successful ICT implementation in Turkish schools. Similarly, Al□Alwani (2005) found that having no access to the Internet during the school day and lack of hardware were hampering technology integration in Saudi schools. Recent research on Syrian schools indicated that insufficient computer resources were one of the greatest impediments to technology integration in the classroom (Albirini, 2006).

Limited Technical Support

Without both good technical support in the classroom and whole□school resources, teachers cannot be expected to overcome the obstacles preventing them from using ICT (Lewis, 2003). Pelgrum (2001) found that in the view of primary and secondary teachers, one of the top barriers to ICT use in education was lack of technical assistance. In Sicilia's (2005) study, technical problems were found to be a major barrier for teachers. These technical barriers included waiting for websites to open, failing to connect to the Internet, printers not printing, malfunctioning computers, and teachers having to work on old computers. Technical barriers impeded the smooth delivery of the lesson or the natural flow of the classroom activity (Sicilia, 2005). Korte and Hüsing (2007) argued that ICT support or maintenance contracts in schools help teachers to use ICT in teaching without losing time fixing software and hardware problems. We believe that if there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly. And if this happens frequently, it will be resulting in a high rate of technical breakdowns. Technical faults might discourage teachers from using ICT in their teaching because of the fear of equipment breaking down during a lesson. In teaching, several studies indicated that lack of technical support is a main barrier to using technologies. According to Sicilia (2005), ICT integration in teaching needs a technician and if one is unavailable the lack of technical support can be an obstacle. In Turkey, Toprakci (2006) found that the lack of technical support was one of two significant barriers to ICT integration in science education in schools and might be considered "serious." In Saudi Arabia, science teachers would agree to introduce computers into teaching, except that they believe they will encounter problems such as technical service or hardware problems (Almohaissin, 2006). Sicilia (2005) argued that whatever kind of technical support and access teaching staff have and whether they have twenty years of experience or are novices to the profession, technical problems generate barriers to the smooth lesson delivery by teachers.

Lack of Effective Training

The challenge most frequently referred to in the literature is lack of effective training (Albirini, 2006; Ghavifekr and Wan Athirah, 2015; Özden, 2007; Schoepp, 2005; Sicilia, 2005; Toprakci, 2006). One finding of Pelgrum's (2001) study was that there was not enough training opportunities for teachers in using ICTs in a classroom environment. In fact, the main obstacle to teachers' use of ICT in teaching was the lack of training. Recent research in Turkey found that the main problem with implementing new ICT in education was the insufficient amount of in□service training for teachers (Özden, 2007), and Toprakci (2006) concluded that limited teacher training in ICT use in Turkish schools is an obstacle. The issue of training is complex because it is important to consider several components to ensure training effectiveness. These were time for training, pedagogical training, skills training, and an ICT use in initial teacher training. Research by Schoepp (2005) concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom, and lack of training concerning technology use in specific subject areas were obstacles to using new technologies in classroom practice. Some of the Saudi Arabian studies reported similar reasons for failures in using educational technology: the weakness of teacher training in the use of computers, the use of a "delivery" teaching style instead of investment in modern technology (Albirini, 2006), as well as the shortage of teachers qualified to use the technology confidently (Sager, 2001). It is believed that if teachers are to be convinced of the value of using ICT in their teaching and their training focuses on the pedagogical issues, they will start using it in their classrooms. The results of the research by Bull et al. (2008) showed that after teachers had attended professional development courses in ICT, they still did not know how to use ICT in their classrooms; instead, they just knew how to run a computer and set up a printer. They explained that this is because the courses only focused on teachers acquiring basic ICT skills and did not often teach teachers how to develop the pedagogical aspects of ICT.

Most teacher training programs in ICT are not helping teachers to use ICT during teaching and learning. This is because training programs do not focus on teachers' pedagogical practices in relation to ICT but on developing ICT skills. Fundamentally, when there are new tools and approaches to teaching, teacher training is essential (Osborne and Hennessy, 2003) if they are to integrate these into their teaching. Osborne and Hennessy (2003) once again expressed that inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out full integration of ICT in the classroom. Newhouse (2002) stated "teachers need to not only be computer literate but they also need to develop skills in integrating computer use into their teaching/learning programs" (p. 45).

Limited Time

Several recent studies indicate that many teachers have competence and confidence in using computers in the classroom, but they still make little use of technologies because they lack the time. A significant number of researchers identified time limitations and the difficulty in scheduling enough computer time for classes as a barrier to teachers' use

Science Education International
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https://doi.org/10.33828/sei.v33.i2.12

of ICT in their teaching (Al□Alwani, 2005; Schoepp, 2005; Sicilia, 2005). According to Sicilia (2005), the most common challenge reported by all the teachers was the lack of time they had to plan technology lessons, explore the different Internet sites, or look at various aspects of educational software. It has been found out that the problem of lack of time exists for teachers in many aspects of their work as it affects their ability to complete tasks, with some of the participant teachers specifically stating which aspects of ICT require more time. These include the time needed to locate Internet advice, prepare lessons, explore and practice using the technology, deal with technical problems, and receive adequate training.

Lack of Teachers' Competency

Another challenge directly related to teacher confidence is teachers' competence in integrating ICT into pedagogical practice. In Australian research, Newhouse (2002) found that many teachers lacked the knowledge and skills to use computers and were unenthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Current research has shown that the level of this barrier differs from country to country. In the developing countries, research reported that teachers' lack of technological competence is a main barrier to their acceptance and adoption of ICT (Al-Oteawi, 2002; Pelgrum, 2001). In Syria, for example, teachers' lack of technological competence has been cited as the main barrier (Albirini, 2006). Likewise, in Saudi Arabia, a lack of ICT skills is a serious obstacle to integration of technologies into science education (Al□Alwani, 2005; Almohaissin, 2006). A worldwide survey conducted by Pelgrum (2001), of nationally representative samples of schools from 26 countries, found that teachers' lack of knowledge and skills is a serious obstacle to using ICT in primary and secondary schools. The results of a study conducted by Pelgrum (2001) have shown that in Denmark many teachers still chose not to use ICT and media in teaching situations because of their lack of ICT skills rather than for pedagogical reasons while in the Netherlands teachers' ICT knowledge and skills is not regarded any more as the main barrier to ICT use. Hence, lack of teacher competence may be one of the strong barriers to integration of technology into education. It may also be one of the factors involved in resistance to change.

In addition, literature shows that opponents of social media use in a classroom continue to downplay the value of such technologies. Among others for example, Barczyk and Duncan (2011) observe that critics of social media academia often point out that social networking sites offer poor reference material often generated by unreliable sources. Some instructors in higher learning institutions have consequently been reluctant to adopt social media in their teaching and learning activities. Some instructors perceive social media such as Twitter and Facebook as distracters to learning (Galagan, 2010). Barczyk and Duncan (2011) and Harris and Rea (2009) highlight additional challenges which include absence of computing resources, disruption of web-based resources, and plagiarism due to openness of content whereby students can copy and paste. Perhaps, to outshine these detractors and challenges reported in this section, it is important to focus on how best these technologies can be put into good use to yield positive results. This can be achieved by aligning social media activities with lesson objectives or curricula (Kietzmann et al., 2011; Wheeler, 2010). Study by Conole (2010) revealed a number of such issues including privacy where it is reported that there is lack of understanding of the implications of adopting more open approaches in technological environments, lack of rewards or incentives for instructors using these technologies in class, lack of skills to use these technologies and a belief that these technologies may not necessarily work in a classroom. Despite evidence about the benefits accrued from the application of social media in higher education, there are some fundamental paradoxes and puzzles that remain inhibitors to smooth adoption of these technologies. Meaning, most teachers of today still hold negative perceptions about the use of technology for teaching and learning, especially in science.

METHODOLOGY

Research Design

The study was quantitative action research. In this, a structured questionnaire was the instrument used in order to enable collection of data from a large and diverse group of students in the Colleges of Education in Ghana. The questionnaire was named Colleges of Education Students' (CoES) Questionnaire. The instrument consisted of two sections "A" and "B." Section "A" was about the demographic information of the respondents. Section "B" covered items (statements) relating to the students' perception about the use of web-based technology software for teaching and learning of biology in their Colleges of Education. Respondents were asked to indicate the extent to which they agree or disagree to each item (statement). The information obtained from the administration of the questionnaire was quantified and analyzed using descriptive statistics: Frequencies and their corresponding percentage values. The frequencies of the students' responses were also represented graphically. Conclusion was drawn based on the data representing the students' responses.

Research Population

The population for the study was students from Foso College of Education, Our Lady of Apostles (OLA) College of Education and Komenda College of Education in the Central Region of Ghana, Holy Child College of Education from the Western Region, Enchi College of Education and Wiawso College of Education in the Western-North Region. The target population was level 200 students in the six selected Colleges who had been introduced to any biology. Students from these colleges were informed of the essence of the study. Participants were also assured of confidentiality of their responses given.

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Sample and Sampling Procedure

Purposive sampling was used to select all the six colleges in the southern part of Ghana and twenty (20) students who had been introduced to biology were randomly selected from each college, totaling of 120. To ensure gender equity, five females and 15 males were selected from each mixed Colleges of Education, thus Foso College of Education, Komenda College of Education, Enchi College of Education and Wiawso College of Education whereas 20 females were selected from Our Lady of Apostles (OLA) College of Education and another 20 females were also selected from Holy Child College of Education. In all 60 males and 60 females were selected for the study.

Instrumentation

As noted, the instrument used for the study was made up of two sections "A" and "B." Section "A" was about the demographics of respondents and section "B" consisted of ten (10) items (statements). The items were constructed in line with the Colleges of Education students' perceptions about the use of web-based technology software in teaching and learning of biology. The validity of the questionnaire was ensured by experts in the area of science education for their suitability before they were administered. The reliability of the research instrument was ensured by pilot testing it on 40 participants from Atebubu College of Education since it shares similar culture and uses the same biology course outline and the coefficient alpha of 0.78 was derived for the questionnaire after the results had been subjected to Cronbach's alpha reliability analysis using SPSS version 21.0.

Each of the ten (10) items or statements under section "B" was scored on a four –point scale. That is, "Strongly Agree," "Agree," "Disagree," and "Strongly Agree." A respondent could select from these scales depending upon one's degree of agreement or disagreement with a particularly item (statement).

Method of Data Analysis

Each of the 10 statements or items under the section "B" was analyzed using descriptive statistics (i.e., frequency and its corresponding percentage for each item was calculated according to respondents' degree of agreement or disagreement with each item, from the scale of "Strongly Agree," "Agree," 'Disagree," and "Strongly Disagree"). The scales of "Strongly Agree" and "Agree" were combined to represent the total number of respondents who agreed to a particular item (statement) while "Strongly Disagree" and "Disagree" were also combined to give the total number of respondents who disagreed to a particular item (statement) as far as their perception about the use of web-based technology software for teaching and learning of biology in the Colleges of Education in Ghana was concerned.

RESULTS AND DISCUSSION

The statistics from Table 1 indicates students' refusal to accept the statement, "My biology tutor uses web-based technology instructional approach during lessons delivery." That is, 118 (98.3%) students disagreed with this item whiles only two (1.7%) of them agreed to it. The second item which aimed to determine whether biology tutors in the colleges of education access internet to search for information during instructional hours, also recorded 119 (99.2%) students and one (0.8%) student disagreed and agreed, respectively, that biology tutor accesses internet during instructional hours to search for information. This means that almost all the students were of the perception that their biology tutors did not access the internet during instructional hours to search for information. Once again, the majority of the students had a negative perception about the item three and therefore disagreed with the statement which read, "My biology tutor gives me opportunity to access internet information at my own pace". Thus, 117 (97.5%) students disagreed, and three (2.5%) students agreed that their biology tutor gave them opportunity to access internet information at their own pace. Furthermore, most of the students' respondents were of the perception that web-based activities improved their understanding in biology concepts. This perception was produced by 104 of the students representing 86.7% of the entire students' respondents whiles sixteen students representing 13.3% disagree to that assertion. For item (statement) five (5), 109 (90.8%) of the students were in agreement whiles the remaining eleven (9.2%) of them were in disagreement to it. This means that the majority of the students were of the view that the use of web-based instructions stimulates their interest and thinking while minority of them were of opposite view.

In response to the statement which reads, "Use of web-based instructional approach just wastes instructional time," only four (3.3%) students agreed whiles 116 (96.7%) students disagreed. Comparing these figures, there is a clear indication that most of the students believed that web-based instructional approach does not waste instructional time. As 117 (97.5%) of the students were of the opinion that they could use web-based software without any difficulties, only three (2.5) of them were in disagreement with item (statement) seven (7). Furthermore, 111 students representing 92.5% refused to agree to item eight which read, "Use of web-based instruction is boring" whiles 9 (7.5%) of them rather agreed to it.

This means that majority of the students have different perceptions about the statement and therefore believed that the use of web-based instruction was not boring. For item nine (9), all the students accepted that the use of web-based instructions individualized learning. That is, all 120 (100%) students were in agreement with the statement, "Use of web-based instruction individualized learning." For item ten, majority of the students disagreed that the use of web-based technology for biology instruction is time-consuming while minority of them agreed. Their numbers were 111 and nine representing percentages of 92.5 and 7.5, respectively.

Figure 1 gives the summary and a quick reference of the students' response of their perceptions about the use of web-

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Table 1: Students' perception about the use of web-based technology software for teaching and learning of biology in the southern colleges of education in Ghana

Statement	Responses (%)				Total (%)
	SA	A	D	SD	
My biology tutor uses web-based technology instructional approach during lessons delivery	0 (0)	2 (1.7)	11 (9.1)	107 (89.2)	120 (100)
My biology tutor accesses internet during instructional hours to search for information	0 (0)	1 (0.8)	9 (7.5)	110 (91.7)	120 (100)
My biology tutor gives me opportunity to access internet information at my own pace	0 (0)	3 .(2.5)	5 (4.2)	112 (93.0)	120 (100)
Web-based activities improve my understanding in biology concepts	14 (11.7)	90 (75.0)	3 (2.5)	13 (10.8)	120 (100)
Use of web-based instructions stimulates my interest and thinking	21 (17.5)	88 (73.3)	2 (1.7)	9 (7.5)	120 (100)
Use of web-based instructional approach just wastes instructional time	0 (0)	4 (3.3)	15 (12.5)	101 (84.2)	120 (100)
I can use web-based software without any difficulties	111 (92.5)	6 (5.0)	3 (2.5)	0 (0)	120 (100)
Use of web-based instruction is boring	2 (1.7)	7 (5.8)	22 (18.3)	89 (74.2)	120 (100)
Use of web-based instruction individualized learning	86 (71.7)	34 (28.3)	0 (0)	0 (0)	120 (100)
Use of web-based technology for biology instruction is time-consuming	5 (4.2)	4 (3.3)	16 (13.3)	95 (79.2)	120 (100)

SA: Strongly agree, A: Agree, D: Disagree, SD: Strongly disagree

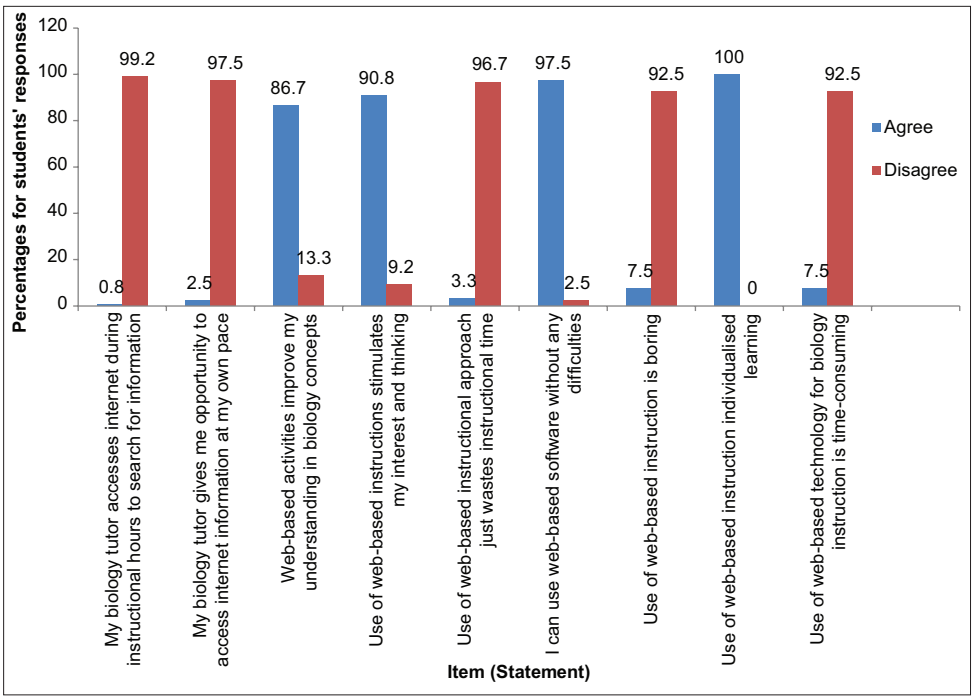

Figure 1: Perception of students about the use of web-based technology software for teaching and learning of biology in the southern colleges of education

based technology software for teaching and learning biology in the Southern Colleges of Education in Ghana.

CONCLUSION

Based on the analysis from Table 1, it can be concluded that biology tutors do not: Use web-based technology instructional approach during lessons delivery, access internet to search for information during instructional hours, provide opportunities for students to access internet information at their own pace. It also came to light that the use of web-based instruction; improved students understanding in biology concepts, stimulates students' interest and thinking, and did not waste instructional time. The study also revealed that students could use web-based software without any difficulties, the use of web-based instruction was not boring, the use of web-based instructions individualized learning and finally, the use of web-based technology for biology instruction was not time-consuming while minority of them agreed.

The perceptions expressed by the students in the six Southern Colleges of Education in Ghana is in agreement with Lim et al. (2013)'s research findings which indicate that students have also taken on a more active role in their own learning process using technology to search for and collate information, and publish and share their findings. Therefore, science tutors in the Southern Colleges of Education in Ghana especially biology tutors must use web-based technology software for teaching

and learning of biology concepts so as to make learning meaningful to students.

ETHICS STATEMENT

Written permission was sought from the principals and the heads of science departments of the selected colleges of educations used for the study.

Protection of participants and their responses was assured by obtaining informed consent, protecting privacy and ensuring confidentiality. In doing this, the purpose and the possible benefits were mentioned to participants.

The participants were assured of the right to withdraw from the study at any time they deemed it fit. As a way of preventing plagiarism, all ideas, writings, drawings, and other documents or intellectual property of other people were referenced indicating the authors, title of publications, year and publishers.

ACKNOWLEDGMENT

All authors participated equally in the research.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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